# Make Your Own 2-D Flying Nanosat!

Something whizzes past your ear. You turn, leap, and snatch the disk from the air. It's a Frisbee! Frisbees flying through the air are fun to catch and watch. One young Frisbee fan, Pete Rossoni, watched them fly and dreamed of spacecraft flying past planets and stars.

Pete took those dreams and his Frisbee with him to college. At college he studied to become an engineer. Pete wanted to design cars, airplanes and spacecraft. After finishing school, Pete got a job at NASA. "Sometimes your dreams do come true," he says.

At NASA, Pete is working on launching satellites like he used to throw Frisbees. These satellites are small, about the size of a birthday cake. "This wouldn't work with big satellites or heavy spaceships like the shuttle," he says.

Pete has a special name for these cake-sized satellites. "Nano" means tiny, so he calls them "nanosatellites" or "nanosats" for short.

Nanosats are a new idea. Usually satellites are big and they cost a lot of money. Sometimes scientists have to save their money for a long time before they can send a satellite into orbit. Nanosats are much cheaper. Because they are so small, one rocket can carry many of them into space. Nanosats ride piggy-back on the rocket. When they reach space, they are flung from the rocket and go spinning into orbit.
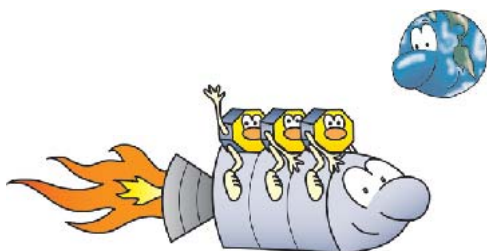
This is where Frisbee meets science. Pete has invented a gadget that can fling a nanosat from a rocket. "It's a lot like throwing a Frisbee," explains Pete. "You need to spin the satellite and release it cleanly—all in fraction of a second."

NASA hopes to launch the first nanosats into Earth orbit in 2004. This mission is called Space Technology 5. Three 8-sided nanosats will ride to space on the back of a rocket, and Pete's invention will throw them off. The nanosats will gather data for scientists about Earth's magnetic field. But this is just extra-credit.
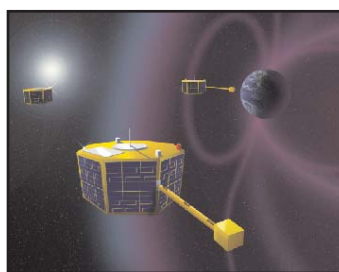
The Space Technology 5 nanosats will test their miniaturized technologies as they study Earth's magnetic field.

Their main mission is to answer some questions: Can nanosats fly in formation? Will their tiny computers (nano-computers!) work? Is Frisbee tossing as much fun in space? NASA plans to find out.

You can make your own 8-sided flying "nanosat" disc out of paper. It also doubles as a "Ninja" 8-pointed star! Instructions are on the next page.

Learn More:

Books:

Northern Lights (Nature in Action), by D.M. Souza (ages 4-8), ISBN 0876146299. (The Northern Lights are caused by Earth's magnetic field, which Space Technology 5 will study.)

Aurora: A Tale of the Northern Lights, by Mindy Dwyer (ages 4-8), ISBN 0882405497.

Web Sites:

Ask the Space Scientist: Earth's Magnetic Field and Auroras— image.gsfc.nasa.gov/poetry//ask/aearth.html

The Space Place: Play the Nanosat Flingman Game! spaceplace.nasa.gov/st5/flingman.htm

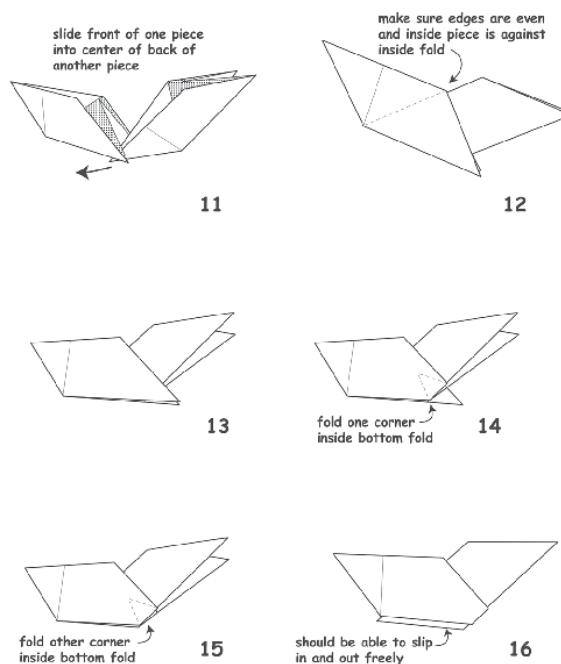Space Technology 5 Web site: nmp.nasa.gov/st5

How to Make Your Flying Nanosat and Star

All you really need are 8 sheets of plain 8-1/2x11-inch paper. Recycled photocopy or printer paper is fine. To make a smaller "Nanosat," you can use 4 sheets of paper, cutting each one in half width-wise first to make 8 smaller sheets. (Where the drawing below shows scissors cutting off one end of the paper, you can crease the paper a few times, then carefully tear off the end piece.)

Fold each of the 8 sheets carefully as shown in these pictures. Fold on a table or desk and make those creases sharp!
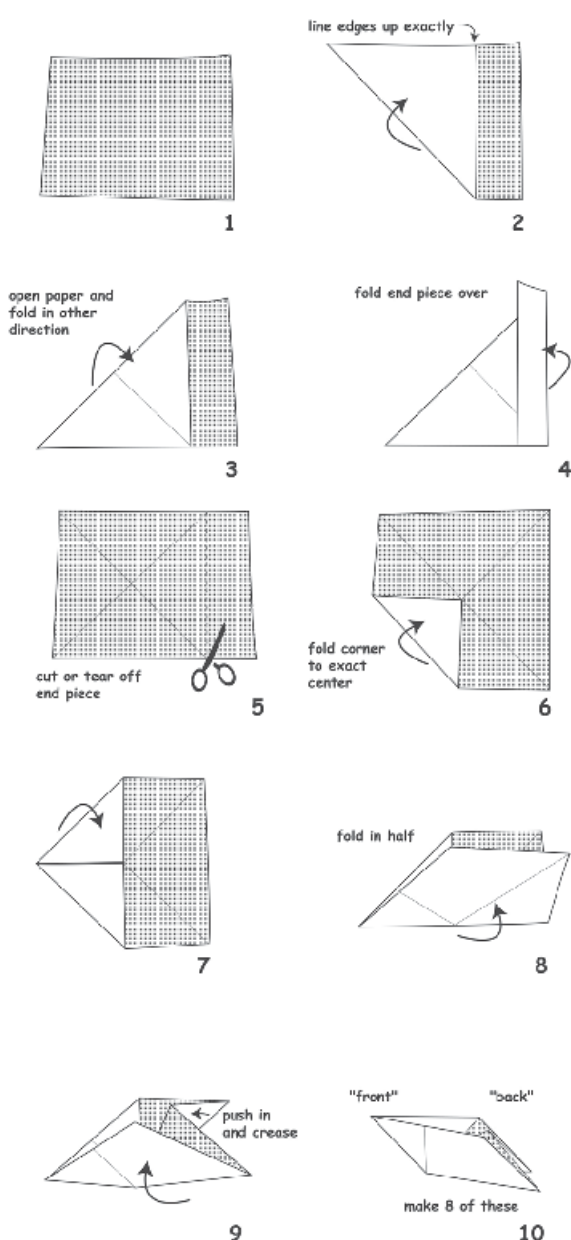
Connect the 8 folded sheets like this:

slide front of one piece into center of back of another piece

make sure edges are even and inside piece is against inside fold

11

12

line edges up exactly

1

2

open paper and fold in other direction

fold end piece over

3

4

cut or tear off end piece

fold corner to exact center

5

6

13

fold one corner inside bottom fold

14

fold other corner inside bottom fold

15

should be able to slip in and out freely

16

When all the folded sides are connected, you will end up with an 8-sided disk. If you push in on opposite sides, the points slide out and you can also have an 8-pointed star!

7

fold in half

8

push in and crease

"front"   "back"

make 8 of these

9

10
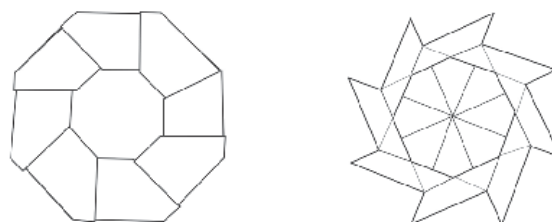
Have fun spinning the "Nanosat" and the star just as the Space Technology 5 nanosats will be tossed into space like Frisbees.